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A Medium of Suggestion & a Record of Progress

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The bronze statue of Alexander Graham Bell unveiled in Brantford, Ontario, last June 18. *See also page 96*

Commercial Engineers Study the Past, Survey the Present, and Consider the Future in Order to Make Forecasts of the Demand for Telephone Service

Where Do We Go From Here?

Harry Disston

HOW MANY PEOPLE in the Alpha Telephone Company's territory will want telephone service? What kind? When? Where? How much?

A broad answer to those questions is the starting point for a host of telephone activities. These primary questions lead to a number of others.

If the "demand" for telephones in the next year is such-and-such, what will it be in three years? What will be the relation of telephone gain to the demand for telephones? How many people will move—within a given city and away from it? How many rural families will want telephone service?

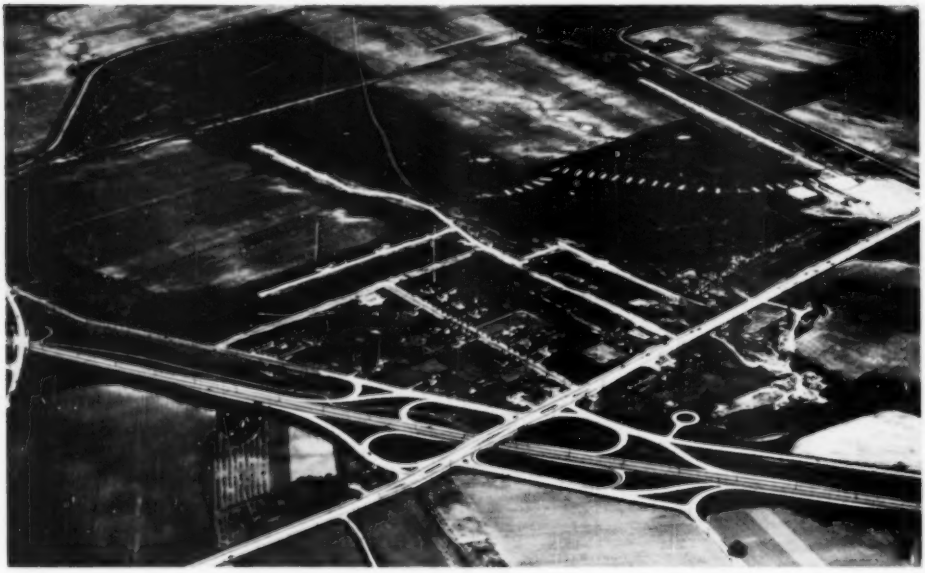
What will be the trend in disconnection of service over the next several years? How many orders will be held for lack of facilities at the end of the year, and what will be the "melt"? In what proportion will applicants ask for one-, two-, and four-party service, and how soon shall we be able to increase the proportion of individual lines to the high percentage existing just prior to the war?

The answers to those questions depend in turn upon answers to others —many of which are provided by various departments.

What is the business outlook—the trend and level of personal income, industrial activity, employment? What will be the trend of consumer credit and prices? How will the trend of telephone growth coördinate with business conditions—will it lead or lag behind?

What is the outlook for residential construction? What will be the annual increase in population? Will people marry at an older or a younger age during the next ten years? What will be the average size of the American family—in urban and in rural areas?

Has the telephone moved permanently higher on the list of the average man's necessities? Have we reached a new phase in the long-term



This picture and the one opposite represent a "crystal ball" problem. The aerial camera found little but highways and empty fields in the Spring of 1947

trend of telephone growth? How will growth in business telephones compare with growth in residence telephones? To what extent will customers' desires for individual-line telephones rather than party line service increase?

Of course, nobody knows the answers to all of these questions—but thought must be given to all of them. The forecaster—the Commercial Engineer—does not attempt to evaluate quantitatively each of the various factors he considers in making his forward look, but he must be aware of each and evaluate them qualitatively. Into the estimate goes a good deal of experience and judgment and, if you like, a certain "feel" for the figures.

The Commercial Engineering people do not attempt to come to their forecasting conclusions alone. The Company Statistician helps analyze and forecast probable business conditions. The Sales and Servicing people advise on promotional plans. The Engineering and Plant men advise on the extent and nature of the construction program and where facilities existing and obtainable are short of customer demand. Managers and district managers provide the local background and point of view which are so important in appraising correctly the probabilities of customer requirements for telephone service in a given community.

Based on these sources and on review of a variety of reference material, the Commercial Engineers assemble and coördinate all the pertinent facts and viewpoints and set them down as assumptions on which to make their forecasts—after the assumptions have had executive approval.

Eighteen months later, this is what the aerial camera saw. There are now some 6000 houses in total in this enormous privately financed housing development

Importance of the Answers

THE PLANS of the Bell System Companies are intimately keyed to one primary piece of information:—approximately how many telephones a company, a city, an exchange, or even a portion of an exchange, will have to serve at some specified time in the future. Or, put another way, what the growth requirements, the "net demand," will be over or during a certain period. This is the primary answer which all the questions just cited must provide.

The Engineers need this information so that they may plan new buildings, new central offices and additions to old ones; plan basic cable layouts and additions to existing cable; and determine the extent of such projects and the time when they should be initiated.

All of the operating departments —Plant, Traffic, Commercial, Accounting—need the information so that they can estimate the amount of work expected of them and provide adequate trained forces to handle it. For the forecast of telephone growth gives a good clue to the number of additional calls, visits, and letters the business-office people will be required to care for; the approximate number of calls for "Operator" and for "Information"; the amount of maintenance to be required for dial equipment and switchboards; the number of bills to be processed; and the size and number of directories to be printed.

The Sales people need the information to determine their markets and to plan their programs.

Those concerned with the financial aspects of the business need it in esti-

mating the amount of money required to finance new construction.

THE RECENT PAST

The post-war years posed a particularly difficult problem for the forecasters. Here was an unusually high demand for telephone service, in 1946 about four times the highest year prior to the war. How long would this continue? Even with the greatly expanded production of the Western Electric Company and the help of other manufacturers and a large increase in force, how many telephones could be added? And to complicate the problem, there was an acute shortage of materials. Those who predicted that the unprecedented demand would continue for several years were right. The Bell System gained as many new telephone customers in each of 1947 and 1948 as during the 11-year period from 1930 to 1941! There were as many telephones added in the three-year period from January 1, 1946, to January 1, 1949, as in the preceding ten years!

TYPES OF TELEPHONE GROWTH FORECASTS

Forecasts of telephone growth are made for a variety of purposes, but the greatest activity in this respect is in connection with forecasts made as a basis for engineering central office relief or additions; for engineering extensions of the outside plant; and for fundamental long-range planning —buildings, new central offices, conduit layout, and similar projects.

These forecasts of telephone growth are also important, of course, in planning and carrying out the comprehensive activities of the Associated Companies for extending and improving telephone service in rural areas.

More than 80 percent of the families in this area of a New England city have telephone service, and about half of them have individual lines

Even in this temporary housing development, more than 60 percent of the families have telephone service or have applied for it

In each case, there is some variation with respect to the period covered, the area included, the amount of breakdown by classes of service, the amount of field inspection, and, of course, the frequency with which the forecasts are made. Such forecasts are generally initiated by a request from the Plant, Engineering, or Traffic Departments when a construction project is being considered.

A Typical Forecast

LET US SEE briefly how a typical forecast is made—one to be used, for example, as a basis for engineering underground cable "relief" in a single-office city.

First, the characteristics and history of the exchange are studied. Tables and charts showing yearly and monthly data regarding growth in total telephones, main telephones, and lines are studied. So are the proportion of various classes of service, and other such factual data summarized from Company records and from previous studies and forecasts. Pertinent newspapers clippings, building reports, and other like information made available by the local manager are also reviewed. A study of these past trends and the current information are then checked against similar trends for the area as a whole.

Next, an engineer, in the Commercial Engineer's organization, makes a field inspection of the exchange—including not only the urban sections but any rural areas covered by the exchange. He takes with him a map of the entire exchange, subdivided into the areas served by each of the main feeder cables and further subdivided within these areas into homogeneous sections.

This semi-permanent housing project near a large mid-Western city contains 3100 units. In them are 1100 subscribers to telephone service, and there are about 200 held orders

On the outskirts of the same city these 30 houses were built in one block. At the time the picture was taken, 27 had been sold and 24 orders for telephone service had been placed

A homogeneous section is one in which the income characteristics of families, and therefore the telephone growth probabilities, are similar. This normally would be a relatively large area, characterized in residential sections by similarity in quality of dwellings, uniformity and density of dwellings, uniformity in the indicated income status of the families, and telephone development. These homogeneous sections are termed "forecast sections."

The general classification in broad

boundaries of each forecast section is reviewed with the local manager (in the larger cities with the District or Division Manager). The manager, as a continuing activity, keeps himself posted as to the local outlook for growth through his contacts and discussions with local realty people and civic and business groups. He is also in touch, of course, with the telephone equipment and plant situation through his Plant and Traffic coördinates.

The engineer, frequently accompanied by the local manager, then makes an on-the-ground inspection of the area for which the forecast is required, noting particularly its character and the probabilities and indications of growth and increased telephone development. The forecast sections within the area are viewed to ascertain that the boundaries, indicated on the map, encompass a portion of the area which is actually homogeneous.

Having finished his inspection of the area, the engineer, with the assistance of the manager, notes basic assumptions with respect to the growth of the area—that is, the "demand" for telephone service—in the next few years. Such assumptions are based on current economic conditions, the results of inspection of the area, and the views of the local people.

DEVELOPMENT AND DISTRIBUTION

Telephone growth in a homogeneous section of an exchange results from two basic factors: an increase in the number of existing families with service, commonly expressed as "percent development"; and an increase in the number of families in the area.

For engineering purposes, the Plant and Engineering people must

Even in this rather run-down section near the city's business center, telephone development is 50 percent

know the number of lines required to serve these families. The number of lines depends, of course, upon the relative numbers of subscribers who want one-, two-, and four-party service (commonly expressed as "percent distribution").

In order to forecast future development and distribution, it is desirable to have some indication of what the development and distribution are currently, in each of the forecast (homogeneous) sections within the area. Records of distribution are available from Company records only for exchanges and sometimes central offices; and since development is associated with families, it is not available at all from official Company records. Therefore, the engineer must determine these two items in the field—on the ground.

The engineer carefully counts the number of families in a sample area and then, from Plant assignment or street-address records, determines the number of families who have telephone service and what grade of service they have. In determining the number of families who have service, any held orders are included. From these data he computes the percent development (families with service) and the percent distribution (individual, two-party and four-party).

THE CRYSTAL BALL

Armed with a knowledge of the general business outlook and the outlook for the area for which the forecast is to be made, a study of past trends, and a thorough on-the-ground review of the area, the engineer estimates for each forecast section what he believes the future development will be.

Based on the number of lines as furnished by the Plant Department and ratios developed from the sampling, the number of main telephones in each forecast section is computed, and a forecast is made of the development in the future. This percentage is applied to the current main telephones to indicate the number of telephones the present families will have. The difference between this figure and the current number of telephones in the area is the growth: the installation of telephones in the homes of families who presently do not have service; penetration of the unsold market.

THE NUMBER of *additional* families who will move into each of the forecast sections is then forecast. This estimate is based largely on the results of the field inspection, during which were observed the type of dwelling, current building, and vacant lots. The building contracts let in the area and the plans of the local realtors are studied. Estimates must also be made of what percent of these new families will probably have service. The development among the new families may be the same, poorer, or better than that estimated among existing families—although generally it is estimated to be the same. From these factors, the growth in telephones expected from the new families is computed.

Adding the growth expected from increased development and that from new families indicates the total telephone growth to be expected in the section over the forecast period.

In this example, we have assumed a continued growth. Under some circumstances there might be, of course,

Left: Five years ago, telephone development in this section of a southern city was less than 50 percent; today it is 75 percent or more

Right: Pre-war telephone development in this "cottage" area was 70 percent. Now the few houses without telephones will have them when facilities are available

a loss of families and a decrease in development.

We have also assumed that the area was residential. Normally, and especially where there is a community shopping and service center in or close to a residential section, the expected growth in the business section is determined by its relationship to the residential section:—so many business main telephones per 100 population, per 100 families, or even per 100 residence main telephones, depending on which of these data, from experience in the local area, are significant and available.

The forecast of main telephone growth is converted to line growth—the information desired by the Plant Engineers—through a simple arithmetic computation. The forecast of two- and four-party main telephone growth is divided by feasible "line fills" determined by consultation with the Plant Department.

ALTHOUGH, in our example of a residential area, there may be few miscellaneous lines, in many sections there might be a considerable number. These are needed for signaling, wired music, radio and video wire channels, alarm systems, off-premise extensions, private lines, and such. The Sales and Servicing people will indicate the probabilities of future demand for these miscellaneous lines.

Now we have the total growth forecast during the desired period, and consequently the line requirements.

But this is not enough.

The specific periods to be covered by a forecast vary, depending on the

time, the place, local conditions, the use to be made of the forecast, the nature of the engineering problem involved, and other such considerations. Having determined the picture for the period ahead, estimates are made for intermediate periods by a combination of interpolation and the same considerations that controlled the longer view.

And still the job is not done. The almost completed forecast—the line requirements in each of the homogeneous sections—must be looked at in perspective, must be examined to see if it is logical. The rule of reason must be applied.

The rate of growth for each of the forecast sections is compared with the rate of growth for the exchange as a whole, and the result is viewed from the standpoint of whether the forecast section would be expected to lead, lag behind, or approximate the views formerly made for the exchange as a whole. The section for which the forecast has just been completed is also compared with other similar sections elsewhere and with expected rates of growth for the state or area as a whole, if such forecasts have been made. If these checks indicate the forecast may not be a sound one, the engineer sharpens his wits and his pencil and reviews the job to see just where he may have gone off the beam.

Finally, the job is done, and the forecast is sent to the Plant Engineer.

CURRENT AND ACCURATE

From the foregoing, it may appear that making a forecast is not too difficult. And that, once it is made, there is nothing more to do but provide the plant to take care of the predicted growth and everything will be serene. You will recognize, however, that we have been discussing only the procedure. The tough part of the job is, of course, the judgment, based on ex-

In this residential area, only 65 percent of the families had telephone service before the war. Today the development is 100 percent

perience, that makes the forecast; makes it a good one or a poor one.

An important part of the forecasting job is keeping forecasts up to date. The periodic records of gain and demand—usually monthly—are reviewed frequently to determine whether the forecast still appears to be sound. If the actual net demand for service (roughly the number of people who request service, less those disconnecting their service) is such that it is clear the forecast is either too high or too low, it is revised.

In addition to the trend of actual growth, revisions are made when some special occurrence indicates the need for doing so. Such special situations might be the announcement of a new real estate development project, the establishment of a main or branch headquarters of some large business organization, plans for a new factory or industry, completion of improved transportation facilities, or other major change.

Occasionally, Commercial Engineers are asked how accurate their estimates are. That's a hard one to answer. It depends, in general, on the size of the area and the period covered. The larger and shorter, the more accurate is the forecast. Over the years, however, it is evident that commercial forecasts of growth used as a basis for engineering have proved sufficiently accurate for a good job in the planning of equipment and plant additions.

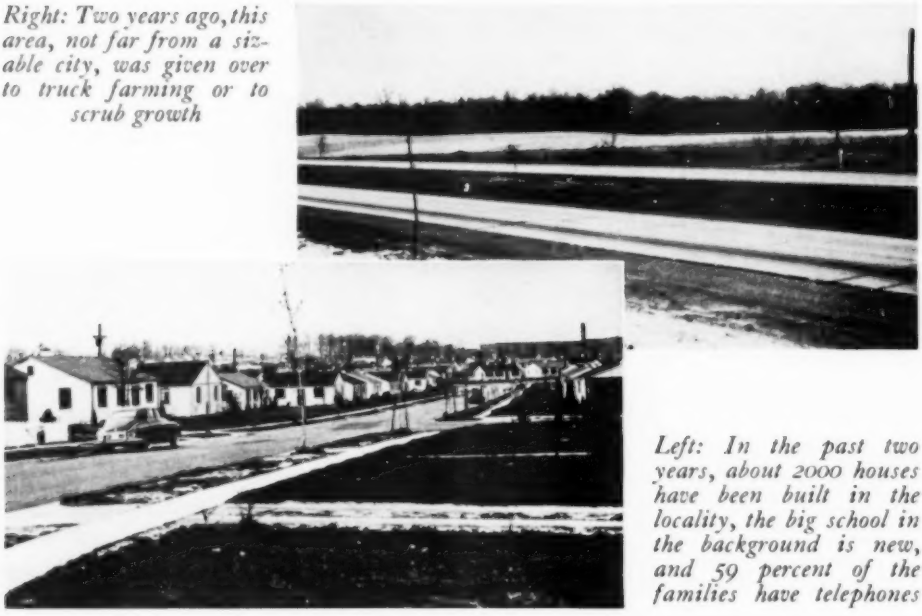
Development—On the Record

IT IS INTERESTING to note the change in telephone development—that is, the percent of families who have service—over the years.

In areas served by the Bell System from 1929, twenty years ago, to 1941, just prior to the war, the percent of families with service remained almost constant at about 40 per cent. But now, after eight short years (on

This suburban area had about 30 percent telephone development five or six years ago. At present the development ranges between 70 and 85 percent

Right: Two years ago, this area, not far from a sizable city, was given over to truck farming or to scrub growth



Left: In the past two years, about 2000 houses have been built in the locality, the big school in the background is new, and 59 percent of the families have telephones

January 1, 1949) the development is almost 66 percent!

By cities, the change is even more dramatic. Twenty years ago, only three large cities (over 50,000 population) had a development of 70 percent and over (i.e., in only three cities did 70 percent or more of the families have a telephone). Ten years ago (on January 1, 1939), the number of cities with a development of 70 percent and over had increased only two, to five. In 1941 there were seven such cities (out of a total of 188, or about 4 per cent). And now, on the first of this year, after an interval of only eight years, there are 112 cities in this classification—52 percent of the cities over 50,000 population have a development of 70 percent or more.

Looking at individual localities, we find some with unusually high development. For example, on January 1 of this year, three cities exceeded 90 percent development. In Evanston, a suburb of Chicago, 99 per cent of the families had telephones; in Newton, a suburb of Boston, 94 percent of the families had telephones; in Kalamazoo, Mich., the development was 91 percent. In Oak Park, outside of Chicago, it was 88 percent; and in Brookline, near Boston, it was 89 percent.

Such high development is not, however, confined to suburban residential areas. In Tulsa, Okla., and Madison, Wis., 90 percent of the families had telephone service; in Lansing, Mich., the development was 88 percent; in Minneapolis, St. Paul, Cedar Rapids, and Dayton, it was 87 percent as of the first of this year.

Times have changed. A substantial increase in average family income,

the sustained high demand for telephone service, the marked increase in toll usage, and the apparently greater "necessity" of telephone service to many individuals since the war, have materially changed the views of forecasters concerning future telephone development. Bear in mind also that many of them are now contemplating in their views of future development a proportion of homes with two lines per family—one for the exclusive use of their "teen-agers."

The Future

THIS IS a difficult time for forecasters. Taking a forward look at telephone growth for the next year or so, and for the longer periods sometimes required for engineering purposes in specific localities, presents some difficult problems.

It is a well recognized human trait that recent occurrences influence us most and that the past is quickly forgotten. Forecasters are human. The telephone growth during the war was, of course, most abnormal. The three years following the war were unusual, different from anything we have had in the past, and pre-war years appear to be far too long ago. The war and post-war years are fresh in everyone's memory and it is difficult to keep them from influencing one's thinking.

The problem in forecasting growth today, then, is to take into account not only the experience of the recent past but also to weigh realistically the possibilities of changes in past trends which may develop because of changes in fundamental economic conditions. The forecaster today, even to a greater extent than in the past, must appreciate the vital part his estimates play in the provision of facilities which will meet the requirements of customers as they develop and at the same time keep additional investment and expense at a minimum level.

Night photograph of the statue in place

The Bell Statue at Brantford

A BRONZE STATUE of Alexander Graham Bell was unveiled on June 18 in Brantford, Ontario, Canada, the city where he lived when he first came to America and where he conceived the idea of the telephone. It is the work of Cleeve Horne, Canadian sculptor, and stands in the portico of the new building of the Bell Telephone Company of Canada at Brantford. The memorial to the telephone's inventor was made possible by the raising of $10,000 in voluntary contributions by members of the Charles Fleetford Sise Chapter, Telephone Pioneers of America.

A photograph of the statue is reproduced on page 82.

Among those who took part in the ceremonies were Mrs. Gilbert Grosvenor, Bell's daughter, of Washington, D. C.; Mr. Frederick Johnson, President of the Bell Telephone Company of Canada; Mr. Thomas N. Lacy, President-elect of the Telephone Pioneers of America and President of the Michigan Bell Telephone Company; and Mr. H. A. G. MacKinnon, President of Charles Fleetford Sise Chapter of the Pioneers.

The statue is a heroic figure eight feet in height. It portrays Bell seated and wearing academic robes signifying the honors which were bestowed upon him for his accomplishments. The inscription on the plain stone base reads simply:

ALEXANDER GRAHAM BELL

1847

1922

On the adjacent wall are the words:

In grateful remembrance of the inventor of the telephone. Erected by the Charles Fleetford Sise Chapter, Telephone Pioneers of America, 1949

Helen Keller Visits the Bell Laboratories

HELEN KELLER, whom Alexander Graham Bell had aided in her childhood,* visited the Murray Hill installation of the Bell Telephone Laboratories last June, and, following her trip, wrote to Dr. Oliver E. Buckley, President of the Laboratories, the letter which is quoted here.

Helen Keller's life story is well known through her remarkable attainments as lecturer, writer, and particularly as champion of handicapped people. After losing her own hearing and sight at the age of 19 months, she later learned the art of vocal expression with the patient help of devoted teachers.

It was Alexander Graham Bell who obtained Anne Sullivan (Mrs. Macy) as Miss Keller's first companion-teacher. Dr. Bell was Helen Keller's firm friend, and her host on many occasions. Miss Polly Thomson, who has been Miss Keller's companion for many years, succeeded to Mrs. Macy's rôle. Miss Thomson accompanied Miss Keller to the Laboratories, and they were in constant communication during the Murray Hill tour. Miss Thomson swiftly conveys messages by means of pressure signals on Miss Keller's palm, and in some instances, Miss Keller reads Miss Thomson's lips by placing the ends of her fingers lightly upon them. Miss Keller spoke back readily or, with her sensitive touch, carried out some action suggested by the demonstrators during the tours.

This is the letter Miss Keller wrote:

DEAR DR. BUCKLEY:

Truly it was a day of wonders which Miss Thomson and I spent at Bell Telephone Laboratories in Murray Hill, New Jersey, and my thanks to you, who made it possible, can be measured only by my lifelong affection for Dr. Bell and proud sense of oneness with him in the growth of his work. Deeply I regret not meeting you there. It would have been easier to speak my pleasure to you than to write it in a letter, but the glow of your kindness will always remain warm in my memory.

Gratefully I recall how freely Dr. Bown, Dr. Walker, Mr. Honaman, Dr. Fry and others gave of their time to taking us around or showing me the various instruments or answering my questions or filling out my mental pictures of the simple yet handsome buildings and their delightful surroundings full of country-sweet peace. It really seemed as if Dr. Bell was with me just as in the past when he used to talk to me about his epoch-making ideas and experiments.

And my upward gaze goes with him,
and I see
Far off against the sky
The glint of golden sunlight on
his wings.

* See "Helen Keller and Dr. Bell," MAGAZINE, Spring 1947.

Everything we saw at the Laboratories bespoke the civilization that would unite mankind in one great family by the spoken word to which Dr. Bell looked forward. It is true, we are still far from peace, despite wider, more swift communications, and nothing seems more difficult, more baffling than to awaken a social conscience that will cause the nations to abandon wars and selfish rivalries. But we all know how Dr. Bell dismissed pessimistic attitudes as futile and unconstructive, and with unwavering faith I anticipate the sunrise of the finer human race he dreamed.

It is hard to decide what interested me most among all the fascinating inventions and processes we saw at the Laboratories. My fingers tingled as they felt the miniature apparatus that promises lighter parts in the telephone, the radio, and the television set, and more satisfying vibrations over the wires. It scarcely seemed possible that mortal ingenuity could have devised such tiny Transistors with wires like spider webs for conducting the voice over long distances. It was a veritable poem—bringing radio rays and sound waves to a focus by means of a field of closely spaced spheres. And how I felt the power of a wizard in the growing of quartz crystals! Always I shall prize among my chief treasures the little crystal and the diminutive amplifying device which Dr. Walker presented to me.

The most absorbing sensation for me was visiting the Free Space Room. Language has no equivalent for the absolute physical silence which burst upon me in that fantastic, bewildering chamber, suspended in what appeared to me an utter void. No, it did not disconcert me. I have known many kinds of silence—the silence of early morning, the silence of remote mountain summits, the silence of gently falling snow. I have been oppressed by the silence of a spiritual crisis, hushed by the silence of a great love and awed by the silence of friendships that had ceased to be. But in the Acoustic Dead Room I had a sense of complete disconnection with the life of the universe. Even before my education began, I noticed vibrations that still ring in my tactual memory, and it was interesting to contrast them with the soundless jolts and jars of footsteps in the dead room. Shut in by floor, walls, and ceiling of fiberglass, I throbbed with the silence of the dead and the silence that covers buried peoples and ages without a history. The music conveyed to me by a spirit-fine nerve of a gadget was a relief beyond words—the vast range of life restored. Not for the world would I have missed those weird moments in that spot of perfect stillness.

Then there were the "thinking" machines! Every time I give them a thought, I am a bit staggered by their superiority to man's brain, at least in its routine processes, but as a student of philosophy, I smile because that superiority does not discredit the Spirit any more than the excellence of a being with all his senses annuls the reality of a life-like mind deficient in sight and hearing. If we only use worthily the advantages that cybernetics is placing within our reach, science will, I am confident, elucidate to us relationships more marvelous than any we have yet comprehended.

It was a pity I could not reach up to Dr. Bell's splendid bust, but now I have the handsome souvenir from the Laboratories containing the motto that he so often repeated to me in one form or other, "Leave the beaten track occasionally and dive into the woods." In it too is Dr. Arnold's noble definition of research and its heroic aims. Do you wonder that I seek in vain for words to thank you all for one of the most luminous days I have ever spent in the Temple of Knowledge?

Please give my cordial greetings to all my friends at Bell Telephone Laboratories and to the employees whose zealous coöperation is a tribute to the genius and the workmanship that produced the immense edifice at Murray Hill.

Sincerely yours,

HELEN KELLER

To Administer Relief in Times of Disaster, This National Organization Relies Heavily on Telephone, Teletypewriter, Mobile Service, Radio Amateurs

The Rôle of Communications In Red Cross Operations

Wade Jones

Staff Writer, Public Relations Division,
American National Red Cross

Where the saving of life and the amelioration of suffering and hardship are at stake, swift and adequate communications may be vital. The following article has been written in response to an invitation to the national organization of the American Red Cross to describe the part played by communications in its disaster relief operations. EDITOR.

WHEN Red Cross national disaster workers talk shop, the subject usually gets around to communications; and communications invariably brings up Vanport, Oregon. For it was during the great Vanport flood of May 30, 1948, that the Red Cross was treated to what seemed like a communications miracle.

Corraled for days behind high levees, the rampaging Columbia River finally broke through into Vanport late on that Memorial Day afternoon. The Red Cross was faced thereupon with the enormous task of providing immediate relief for more than 18,500 homeless.

The organization's disaster experts on the scene were prepared for the deluge of phone calls which followed. But they weren't entirely prepared for what the local telephone company did about them.

What the Pacific Telephone and Telegraph Company accomplished in the first hectic hours at Vanport remains, as far as the Red Cross is concerned, an outstanding example of productive effort at its best.

Within three hours after the levee broke, twelve lines were cut into the main Red Cross switchboard at chapter headquarters in Portland. In another two hours a second switchboard

with eight lines was in operation. At the same time, 14 direct central-office lines were installed for various disaster officials.

By the following morning, 16 hours after the break, telephone representatives had issued a mimeographed directory of Red Cross key personnel, helping reduce confusion in locating persons at the Portland chapter headquarters. Also, a loud speaker paging system and an information center had been installed.

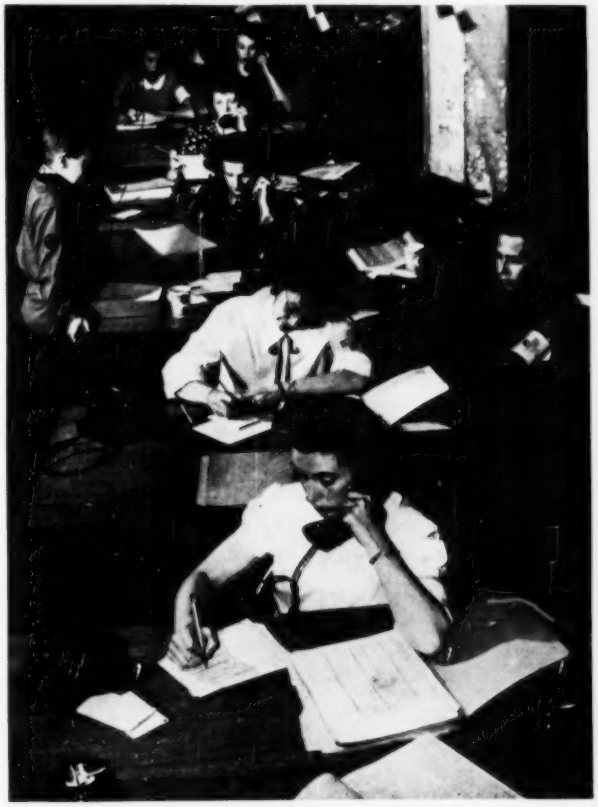
But by Monday night, a little more than 24 hours after the levee gave way, even the newly expanded telephone set-up was bogging down under the avalanche of calls—mainly from persons inquiring about the safety of friends or relatives. So a temporary disaster headquarters was hurriedly established in a recently vacated building. Again, the telephone workers pitched in. They speedily reactivated a two-position, 80-line switchboard with approximately 20 trunks and 50 stations. At the same time private lines were cut in between the new headquarters and the home service bureau at the chapter offices.

However, as the tremendous impact of the disaster spread throughout the nation, and with the growing relief problem at the scene, the work

Red Cross volunteer telephone operators handled more than 30,000 calls a day during the emergency created by floods in this country's Northwest last year

of the Red Cross continued to mount. So again more space was needed and again the telephone people went to work. Chosen as the newest headquarters was the basement of Portland's Municipal Auditorium, and into it telephone workers rushed two 80-line switchboards, originally assigned to a private business concern.

Cable cuts and transfers were hurriedly made to utilize every available pair of wires. The telephone business office asked the occupants of one entire building to give up their service for a few hours so that their central-office lines could be used by the Red Cross. The reply was immediately and enthusiastically affirmative. The 50-pair cable serving the building was swung over to the auditorium, and splicers worked throughout the night to make the connections.



Scene at a Red Cross disaster relief headquarters as volunteers handle telephoned inquiries and Boy Scouts stand by as messengers

Installers laced the auditorium ceiling with a network of supports for the switchboard cables and station wires. Pairs were pulled into place, identified, and tagged at all desk locations as the desks were moved in.

In the words of one thoroughly impressed Red Cross worker, "The movers would bring you in a desk, and before you could locate a chair the telephone people would have a phone on the desk. Not only that, but the phone would be ringing!"

Some 40 handset telephones were connected to individual lines arranged so that calls coming in for information or for reports on missing persons automatically sought the first idle telephone in the group. And few remained idle long at the peak of activity.

Finally an additional switchboard —the fifth—was installed on the second floor of the auditorium. Along with it were six trunks, two tie-lines

to the basement switchboard, and two toll terminals to speed emergency long distance calls.

In the first week at Vanport, Red Cross volunteer telephone operators handled approximately 31,000 calls a day.

But not in terms of machines and equipment alone is the story of Vanport told. With the Red Cross and the telephone company, as with other organizations who fought the flood and its effects, the big story of Vanport must be told in terms of people—simple courage facing up to danger, stubborn will battling with sleeplessness and fatigue, and the always wonderful-to-see readiness of the ordinary man to come to the aid of his fellows.

Despite official orders that the Vanport telephone office be evacuated, the operators stayed on as the waters rushed through a broken dyke and swept into the streets. Every call that came in, the operators answered with warnings to get out of the area.

The traffic load became so heavy that fuses blew. They were replaced. Calls still were answered. Finally the power failed entirely. It was then the girl operators left in a telephone company truck, which had been standing by for just that purpose. By the time the truck reached safe ground, flood waters were swirling around the office roof.

One of Many

LOYAL, COURAGEOUS PERFORMANCE of duty by telephone workers in time of disaster is traditional. As far as the Red Cross is concerned, it is almost axiomatic.

Take the case of Johnny Urquhart, Southwestern Bell employee, in the Texas City disaster.

While the building he was in still shook from the tremendous blast, Johnny hung onto the switchboard with one hand and with the other plugged a cord into the Houston circuit to get G. H. Hearon, division traffic superintendent in that city.

"For God's sake, send the Red Cross!" Johnny cried to Hearon. "There's been a big explosion here and thousands are injured."

The next moment Hearon had dialed the telephone number of the Houston Red Cross, and was telling Miss Mary Snoddy, chapter executive secretary, that doctors and ambulances were needed at Texas City immediately. In a matter of minutes help was on the way, as the Houston Red Cross chapter swung into operation on a plan of action laid out long in advance for just such a disaster as had now struck.

Back in Texas City, Johnny Urquhart brushed away the glass and debris around the switchboard and continued to plug through emergency calls. He stopped only for a moment —to give first aid to Chief Operator Iola Sheldon, who had been injured by flying glass. She refused to leave her post. Johnny stayed at the switchboard for 16 hours straight.

TEXAS CITY, incidentally, provides a good example of a special service which the Red Cross renders. For if you ever want information about the well-being of relatives in a disaster area, and have been unable to reach them by telephone or telegraph, just call your local Red Cross chapter. It will have a report for you in the

shortest possible time, and without charge.

One such inquiry, from service-men in Japan, picked up by amateur radio operators in California and relayed by wire to Texas City, asked for information on 30 different people. To get the answers to that single message, the Red Cross, with help from Boy Scouts and young church workers, made 116 home visits and 165 telephone calls.

Importance of Communication

THERE ARE 3,739 Red Cross chapters in the United States and each has at least one telephone. Chapters in the larger cities, of course, have many. The organization's national headquarters in Washington, D. C., and the Pacific Area office in San Francisco, have switchboards, with interoffice dialing. The three other area offices—at Alexandria, Va.; Atlanta, Ga.; and St. Louis, Mo.—have manual switchboards.

As an important part of its communications system the Red Cross, both in disasters and in its normal day-to-day operations, leans heavily on its 10,000 miles of leased teletype lines across the country.

When a major disaster strikes at a point not directly connected with this system, the Red Cross imme-

Instruction in the use of various communications facilities is part of the training given Red Cross Chapter members. This switchboard is U. S. Forest Service equipment

diately places an order with both the telephone company and Western Union for a leased wire teletype circuit from the disaster scene to the nearest of the 43 terminals on the teletype system. The understanding is that the Red Cross will get the first circuit available with either organization.

At Vanport, for instance, a circuit was leased to San Francisco. From Texas City, the main line ran to Dallas via Galveston. In the New England forest fires during the fall of 1947 the circuit was from Biddeford, Me., to Boston, Mass. This communications system is of vital importance when other communications into a disaster area are overloaded or disrupted.

The Red Cross teletype system was instituted in October, 1946, and, with telephone relay of messages, serves some 400 points. Another 2,900 are reached by commercial telegraph refile. Economy and speed are the governing factors in determining how a message is to be sent.

A member of the American Radio Relay League receives a message by telephone from the Red Cross for radio transmission to a fellow League member operating at a disaster area

Auxiliary Means

IN DISASTERS where normal communications lines are either disrupted or overloaded, the Red Cross has always depended to a considerable extent on amateur radio operators. Of the 80,000 "hams" who pursue their hobby across the length and breadth of the country, several can be depended upon to turn up at nearly any given disaster scene, no matter how remote.

To aid them in their work, and to increase their value to the Red Cross, the organization recently got together with the American Radio Relay League and the U. S. Naval Reserve and came up with a nation-wide emergency radio system.

The "network," hinged upon stations at Washington, D. C., Chicago, and San Francisco, went into operation last winter. In the event of a disaster which interfered with the functioning of regular communications, amateurs at the scene of the catastrophe would go into action, handling the most essential emergency traffic until normal facilities could be re-established.

Their messages would be directed to the nearest of the three big Red Cross stations. The stations, in turn, manned by amateurs and naval reservists, would go on the air round-the-clock, monitoring all messages and routing them to their proper destinations via Red Cross teletype and commercial telegraph.

A Red Cross mobile radio unit. Operated by volunteer amateur radio operators, it is equipped to relay emergency messages to and from the scene of a disaster when normal means of communication have been destroyed

As a double check, insuring communications coverage of any part of the United States, Red Cross headquarters in Washington also has available a mobile amateur radio station with its own auxiliary power supply. This station can reach other types of radios which might be in operation in a given disaster area—state and local police, military, etc.

The unit can be used in an automobile, or can be dismounted and flown into a disaster area by plane. Eventually, Red Cross national headquarters plans to have three such mobile stations placed strategically through the country in areas where and when seasonal disasters can normally be expected—the south and southeast during the early fall hurricane season, the south and southwest in the time of spring tornadoes, the Ohio and Mississippi valleys during the late spring floods.

Among the several Red Cross chapters which have Bell System mobile radio telephones is the one in Jackson County (Kansas City), Missouri. Using these, and with the aid of amateur-owned and -operated walkie-talkies, chapter disaster workers did an outstanding job last spring in providing up-to-the-minute warnings by telephone and radio to residents in the lowlands along the flooding Missouri River. All endangered families were safely evacuated. Robert Edson, of St. Louis, director of Red Cross disaster operations in the Midwest, called the operation "as complete a job of disaster communications as has taken place in recent years."

In all large disasters, the Red Cross works closely with those

branches of the Armed Forces operating at the scene as well as with the government agencies *—local, state and federal.

An outstanding example of such coöperation was during the early part of this year, when the Red Cross and the Army fought shoulder to shoulder against the violent, crippling blizzards in the West.† The Red Cross, whose primary responsibility in disasters is to assist individuals to meet disaster-caused needs they cannot meet themselves, did just that in the blizzards. By chartered plane, snow tractors, and afoot, the Red Cross provided badly needed food and medicine to the snowbound, and evacuated dozens of sick and injured, as well as several expectant mothers, from the wilderness of drifts and cold. The Army, using its big planes and whatever surface vehicles would negotiate the drifts, devoted most of its efforts to opening roads and getting food to stranded livestock. The work of the two organizations dovetailed nicely, but did not overlap.

Communication Plans

SOME HARD-WON INFORMATION on the general subject of communications as they affect the Red Cross in time of disaster comes in a report from Mr. E. A. Valentine, who was chairman of the local Red Cross disaster committee at the Vanport flood. In relating difficulties brought on by the overwhelming load on communications facilities in the first hours of the flood, he warns, "Above all [in making disaster preparedness plans] don't ignore communications!

"Our advice is to get a telephone company official on your [Red Cross] disaster committee and give him free rein on communications set-ups from the very first. He, more than anyone else, can unsnarl what seems to you a hopeless mess. Let him set up two groups of telephone lines if he wants, so that one can be taking incoming calls while the other remains clear for outgoing calls."

The national Red Cross disaster service in Washington, in its guidance to chapters, lays strong emphasis on preparedness for catastrophes. The organization's manual, "When Disaster Strikes," contains this advice on communications preparedness:

"Survey all . . . communications resources within the chapter jurisdiction and obtain pledges of voluntary coöperation from organizations and individuals whose facilities or services would be essential to the performance of the [disaster] committee's function in time of emergency.

"Contact commercial communications companies and amateur radio stations and operators, including members of the American Radio Relay League, to develop a plan for extending priority for emergency communications and for receiving and transmitting all Red Cross messages by telephone, telegraph or radio. . . .

"Plan for the maintenance of a message center in time of disasters and have the center under control of the [Red Cross] subcommittee in cooperation with communications agencies.

"Plan for the mobilization and use of portable telephone systems and portable radio transmitters.

"Formulate a written plan."

* See "The Coast Guard Operates through Communications," MAGAZINE, Winter 1946–47.

† See "The Winter's Toll Was Heavy from Texas to the Dakotas," MAGAZINE, Spring 1949.

The Scope of Red Cross Activities

THIS STORY of Red Cross communications has been told in terms of disaster work, for it is in those terms that the rôle of communications can be told most graphically. It is not to be supposed, however, that communications do not play a large and necessary part in the many other Red Cross activities.

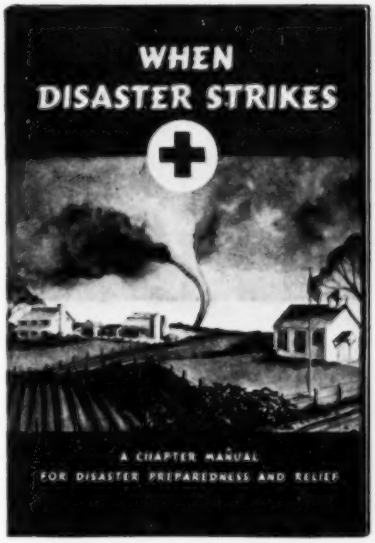
Actually, by the very nature and tremendous scope of the total Red Cross operation, it is obvious that communications would have to play an important over-all rôle in the organization's work.

A few facts illustrate the extent of American Red Cross activity:

The organization's membership totals 37,524,000. There are 3,746 chapters and more than 5,000 branches. In the last fiscal year, funds expended by the chapters and the national organization totaled $101,900,000.

The Red Cross has approximately 1,471,200 volunteer workers, 7,300 of whom, with assistance from 6,800 paid chapter workers, last year handled 768,000 cases involving servicemen and their dependents, 1,782,000 involving veterans and their dependents, and 192,000 cases of civilians and others.

An average of 10,000 volunteers and 1000 paid workers served 142,600 patients in more than 130 military hospitals. Field directors and other paid Red Cross workers gave assistance in 622,100 servicemen's cases in 265 military camps.



The American Red Cross is a quasi-governmental agency, and this handbook, prepared by National Headquarters, helps the Chapters to be prepared to discharge their responsibilities "when disaster strikes"

In more than 300 major disaster operations the Red Cross assisted 312,400 persons and spent $12,171,000 during the fiscal year ending June 30, 1948.

The organization now has in operation twenty-eight blood centers throughout the country.

And this by no means comprises all the Red Cross services. Yet it indicates the nature and extent of the organization's work, and in so doing gives some idea of how invaluable are communications, in all forms, to the integration of its many functions.

Progress of the Rural Service Program

The following paragraphs are from a mid-year summary of progress of the rural service program by Vice President Cleo F. Craig, head of the Department of Operation and Engineering of the American Telephone and Telegraph Company.

THE TELEPHONE COMPANIES throughout the nation are now in their fourth consecutive year of record-breaking rural telephone construction to meet the unprecedented demand for service which has sprung up during and since the war.

The companies are pushing new telephone lines into remote ranch and farm sections. Regions where few farmers, if any, ever wanted telephone service are now anxious to get it. Better incomes in recent years have created a tremendous interest among farmers in modernizing their homes; naturally, they want more and better telephones.

So great has been this up-surge in the applications for rural telephone service that it demanded the building of literally tens of thousands of miles of new pole line and the stringing of about a million miles of wire—to say nothing of many new buildings and vast quantities of switchboards and other equipment.

The Primary Aim

THE PRIMARY AIM of the companies has always been to provide good telephone service as fast as practicable to every one who wants it, wherever he may be, and at reasonable rates. The army of engineers and construction men now engaged in the rural program has been building rural telephone plant at a rate three times as fast as ever before in history.

Though much still remains to be done, the level of the farm telephone development in six of the nine geographical regions of the country, as defined by the Bureau of the Census, is already at high levels—about 70 percent, the same as in the cities. In scattered sections of the South and Southwest, which make up the other three regions, the opportunities for extending service have increased tremendously in recent years. The telephone companies are concentrating their utmost efforts in these areas, and excellent progress is being made. Since 1940, the number of farms in those sections having telephones has increased over 100 percent. Half of all the new rural pole line construction in the entire Bell System has been concentrated in the Southern Bell and Southwestern Bell telephone companies.

Southern Bell, for example, has spent over $49,000,000 since the war to boost its telephones in rural areas from 171,000 at the end of 1945 to 372,400 on June 1, 1949. The job is not yet completed; but with its accelerated pace, the company expects to catch up with customer demand one of these days.

Southwestern Bell, too, has doubled its rural telephones. Since V-J Day that company has set 440,000 poles and strung 120,000 miles of wire, nearly tripling its rural plant investment. About one-half of the establishments in Southwestern Bell's

rural areas now have service, and the remainder can be taken care of in the not too distant future.

During the war, when applications for service were piling up in rural as well as urban areas, the telephone industry designated "Rural Telephones" as one of its most important jobs. The Bell System set its sights for a million more telephones in rural areas as rapidly as possible after the war. It appeared then that it might take as many as five years; but despite serious shortages in materials and supplies of all kinds, the millionth instrument went into service last December—in just a little over three years. The number of telephones added in rural areas since the war totals today about 1,200,000, and the work is continuing unabated.

About Half the Farms Now Have Telephones

As a result of this unprecedented performance of the Bell companies, plus the nearly 400,000 rural telephones added since the war by the 6,000 independently-owned telephone companies, about half of the farms in the United States now have telephones. This is twice as many as in 1940. Rural telephone service now is available, without any construction charges to customers, to a vast majority of the nation's occupied farms.

In addition to adding more telephones, the Bell companies have also made great strides in improving the quality of service in rural areas. The number of parties on a line is being reduced to not more than eight. Today 70 percent of all rural customers are on lines with eight parties or fewer, compared with 62 percent at the beginning of 1946.

Improvements in Service

Improved ringing techniques are enabling Bell customers to hear the rings of fewer parties on their lines. Eighty-seven percent of all rural customers now have better ringing, compared with 76 percent in January 1946.

And as rapidly as possible, the magneto —crank type—telephone is being replaced by more up-to-date instruments. Today 88 percent can signal the operator simply by lifting the telephone from its cradle. This compares with 78 percent three and a half years ago.

To make it easier for farmers and others in rural areas to get telephone service, the amount of new pole line which the Bell companies will build for each new subscriber without charge has been substantially increased. Free construction of a half-mile of new pole line is now generally allowed for each new customer. In addition, this allowance is being applied on an area coverage basis, which means that where lines are being extended to serve a particular section, any unused portion of a customer's free allowance is credited to other customers in the same neighborhood who need more.

The telephone companies' rural program still presses forward. All the attention, resources, and experience of the Bell System are being brought to bear on the important job. The problem is recognized by the industry's leaders as one of the most vital challenges of recent years, and this challenge is being met.

Four Early Correspondents Reveal What Went On during The Months when the First Bell Company Was Struggling To Become a Going Concern

Robert Devonshire's Letterbook

Ralph E. Mooney

IF YOU READ much Bell System mail, you probably will think the following letter a bit unusual:

Dear Sir: Some time ago we sent you some telephones, since which time we have not heard from you.

Please write us saying how they have worked and if they have given satisfaction and oblige.

Yours truly,
BELL TELEPHONE COMPANY
per R.W.D.

As a letter, that meets two qualifications desirable today: it goes to the point and it wastes few words. Nevertheless, a modern business man might be somewhat surprised to get one like it from any of the Bell companies. He might wonder what "some" telephones could mean, and why we should doubt whether they would work satisfactorily.

But its peculiarities are easy to understand when we take into account that it was sent to a man in Appleton, Wisconsin, in August, 1877, just a day or two after R.W.D., or Robert W. Devonshire, went to work for the first of all Bell telephone companies, at Boston. It comes to us from a letterbook that is now a part of the material in the American Telephone Historical Library, at A. T. & T. headquarters in New York.

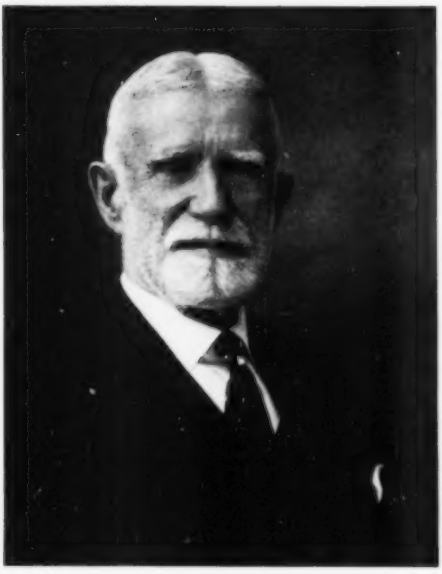
Many of us today may not know what a letterbook is. This specimen is a cloth-bound volume, nine inches wide, eleven long, and about an inch thick. It contains, on 500 tissue sheets, copies of practically all the outgoing letters of the telephone business from August to December, 1877. It is the System correspondence of four months bound in one short volume, you might say—although at the time the correspondence was written, the Bell Telephone System was no more than a gleam in the eye of certain of its founders.

This letter press, in the A. T. & T. Historical Library collection, is similar to the one with which young Robert Devonshire made copies of the earliest "telephone company" letters. Open beside it is the first letterbook, containing the actual copies of outgoing letters between August and December, 1877, some of which are quoted in the accompanying article

Typewriters were still in the experimental stage, in 1877, so all letters were written by hand. If you wanted to keep what you would call today carbon copies, you would provide yourself with a letterbook and a letter press. The process was to write the "orginal" of your letter in the very clearest script you could command, using copying ink. That done, you would place the original underneath a blank tissue sheet in your letter book. You would moisten the tissue sheet, and would put a piece of blotting paper over the damp tissue. Then you would close the book and arrange it on the bed of your letter press. You would screw the press down tightly and leave it a while. A copy would transfer from your original to the under side of the moist tissue—so that you would have to read the copy through the tissue rather than from the upper surface of it, if you should need to refer to it thereafter.

It was a slow process, which generally mussed both the original and the copy, but it did preserve exact duplicates of business letters.

Such a letterbook preserves much more than the letters, with their



No picture of Robert W. Devonshire as a young man is available. This one shows how he looked on the occasion of a dinner in honor of his fiftieth Bell System service anniversary, in August 1927

varying scripts and the—to us—curious abbreviations of words that you sometimes find. Our book of 1877 not only recalls the atmosphere of those months when there were only four men in the telephone business, but makes it possible for each of the four to tell us in his own words something of the problems he had to meet and solve. What we are dealing with, actually, is an intimate and priceless record of facts and personalities.

Some Early History

A BIT OF BRIEFING is in order here, to bring us up to date—to August, 1877, that is. About three years before Devonshire wrote his somewhat vague letter to the Bell agent at Appleton, Alexander Graham Bell had begun experimenting on a method for sending several Morse messages simultaneously over a telegraph wire. Thomas Sanders, successful leather merchant of Haverhill, and Gardiner Greene Hubbard, civic-minded Boston lawyer, had agreed to finance Bell's experiments, and shortly thereafter Thomas A. Watson, a young technician at Charles Williams' electrical shop in Boston, had become in effect Bell's laboratory assistant. Bell had at the back of his mind the idea for transmitting speech electrically; and on June 2, 1875, an experiment on the telegraphic device brought a result that verified his telephone theory. Thereafter nine months or more of experiment and study had

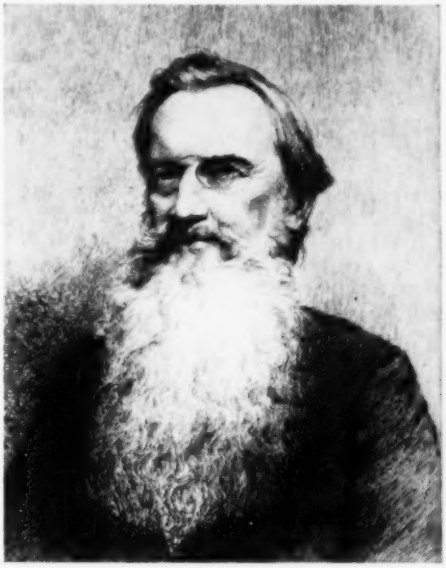
This picture of Thomas A. Watson, the man who made Bell's first telephone, was taken in 1878, when he was 24. During the earliest years of the business, he was largely responsible for the practical development of Bell telephone service

elapsed before his first patent was applied for, February 14, 1876.

Bell's telephone attracted some attention at the Philadelphia Centennial Exposition, the following June. Thereafter, scientific demonstrations of it had been made. Public experiments had been performed. But still no telephone business had developed. Indeed, the first money the telephone had earned was from 50-cent admissions to lecture demonstrations by Alexander Graham Bell in person.

At last, however, a few telephones had been rented for service toward the end of May, 1877. That made Bell, Hubbard, Sanders, and Watson feel there might be something in it after all, and they had formed the "Bell Telephone Company, Gardiner Greene Hubbard, Trustee."

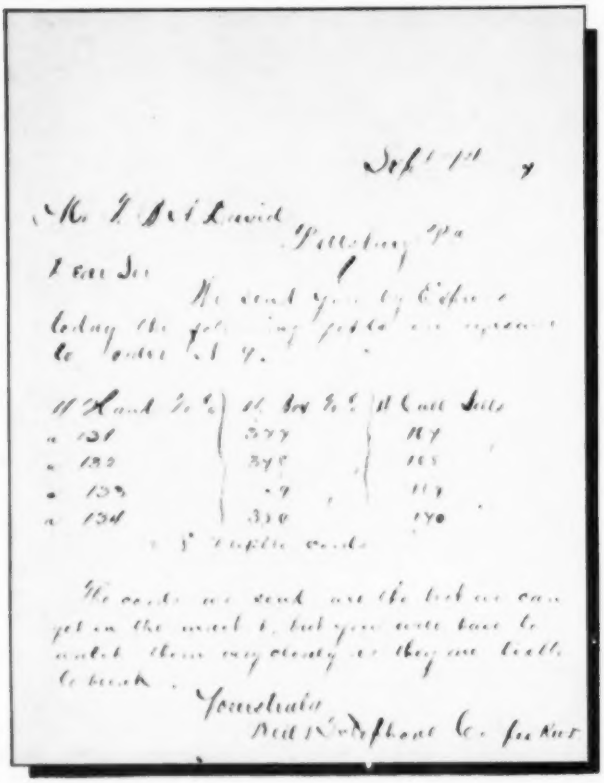
Thomas Sanders, an able business man, had confidence in the future of the telephone, and backed it with more than $100,000—which was no small sum seventy-odd years ago



Gardiner G. Hubbard, always a man of vision, estcblished the policy of renting telephones rather than selling them; that is, making the telephone company responsible for providing telephone service

You may wonder why Hubbard was named trustee and not president. Probably it was because trustees are common phenomena as administrators of property and enterprises around Boston. Furthermore, you do not usually have a president until a corporation has been formed, and this was not a corporation. Whatever the reason, the trusteeship papers were signed July 9, 1877. Two days later, Bell was married to Mabel Hubbard, daughter of Gardiner G., and soon thereafter sailed with his bride for England, where he was to remain more than a year in efforts to get his telephone established in that country.

So Hubbard, Sanders and Watson were left to set up the business. All telephones rented at this



After 72 years, the copies in the old letterbook are too faded to reproduce clearly. This one, representative of much routine correspondence, lists by number four hand telephones, four box telephones, and four call bells. The signature is typical: "Yours truly, Bell Telephone Company per R. W. D."

period were for private-line use—or, as these founders put it, "for speaking tube purposes." Three experimental switchboards had been tried, but months were to elapse before anyone would be ready to launch a commercial telephone exchange.

Enter R.W.D.

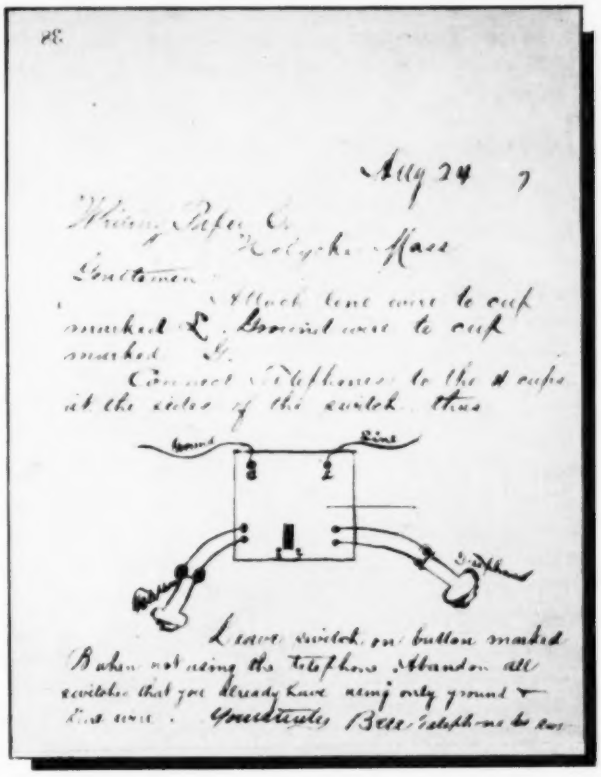
THAT WAS WHERE Devonshire came into the picture. Eventually he was to become an A. T. & T. vice-president (he served as such from 1913 to 1930); but in August, 1877, he was just a youngster trying to be both Commercial and Accounting departments of the new enterprise.

He was in virgin territory with rather a free hand. For Sanders, while treasurer of the Bell company, with all the duties of operating vice-president too, was forced to give considerable attention to his leather business at Haverhill, some miles from Boston. Hubbard, administrative head of the company, was spending most of his time in Washington as chairman of a Congressional postal committee—a post to which he had been appointed by President Grant—and carrying on his law practice. Watson, who served as Research Engineer and Plant Department combined, was the only other full-time employee, with Devonshire—unless you want to count a few men in Williams' shop who by now put in their full time making telephones.

Devonshire most likely was the one who went out to some convenient stationer's to buy the letterbook, as well as the one who tended it, taking on the office-boy chore of transferring letters in addition to his many

other duties. At any rate, the book begins about the day he went to work.

He signed his mail "Bell Telephone Company—per R.W.D.." and to him fell the job of explaining time and again that the magneto telephone bells then in use "cannot be used practically for more than 3 stations for the reason that even if the bells work well it causes altogether too much resistance on the line to talk through." Also he frequently had to tell new customers that "the best arrangement and the one that is almost universally adopted for business purposes is a box instrument [telephone] to talk to and a hand instrument to listen with at each station."



"Connect Telephones to the 4 cups at the sides of the switch thus," says this letter, and makes the "thus" clear by a diagram in the middle of the text—a convenience which the modern carbon-copy method of preservation does not afford letter writers.

From a letter he sent to Bell agents at Savannah, Georgia, we learn that "There should be no trouble on account of noise made by surf. Put up a box and a hand instrument, and at noisy places listen with the box at one ear and the hand at the other." Here Devonshire mentions an interesting early experiment: "We have used the instruments on an Express train going 40 miles an hour, communicating from Engine to 3rd passanger car with good results."

By November, however, while Sanders was on a trip to Detroit, Devonshire was able to write a letter that indicates that he and the business had made considerable progress:

> In regard to correspondence, there has only been a few letters that would require your attention and Mr. Watson thought I had better not send them but wait until your return. If anything important came up would telegraph you.
>
> Have received P.O. orders to the amount of $70 from J. Ponton. Have money

enough in the cash drawer without using any of the above until after your return home. Have orders on the books at the present time for 872 instruments.

Devonshire also sent forth a steady flow of invoices for shipments of two, four, six, or a dozen telephones. In each the serial numbers of the instruments were laboriously copied by hand. And, as each telephone customer signed a lease for equipment rented to him, Devonshire was constantly acknowledging receipt of leases numbered such-and-such from the growing list of agents appointed by Hubbard and Sanders. And—naturally—he was constantly finding mistakes in the numbering of the leases, or in the serial numbers of equipment covered by the leases, all of which required more letters as well as corrections of his records. He also wrote letters in a secretarial capacity for Sanders, Watson, and even Charles Williams to sign. Quite a job young Devonshire had, with three alert and enterprising heads above him.

He Footed the Bills

Upon Thomas Sanders fell the burden of keeping the infant enterprise on its feet, and his letters make evident the slenderness of the reserves on which the telephone business ran during those months. It is hard to comprehend now that the "telephone company" ever had to live from hand to mouth, but ours is just one of a great many American businesses that have passed through such periods in their beginning years. As a matter of fact, Sanders was the "angel" who "rescued the show" time and again, in 1877. He risked all he had, a few thousand dollars at a time, and borrowed until he put altogether $110,000 into the telephone, before it earned him a dollar of personal return.

In August, our letterbook shows him writing to Hubbard:

Mr. Williams' bill is $4186—therefore we shall have to put in the $5,000 you spoke to Mr. Watson about—$2,500 each. Will you send me your check for $2,500 loaned the Company and I will do likewise, as we ought to start square with Williams. Collections cannot be forced. I have jogged them all. . . .

And here are three samples of Sanders' jogging, taken from his letters to Bell agents:

As you have 369 Telephones and Calls [signaling equipment] altogether, I tho't you must be in receipt of at least $1,000 and as I had occasion for the money telegraphed if I should draw on you, I hope you will remit as soon as possible.

(The process referred to may not be familiar. If someone who owes you money, or just someone who has money, gives permission for you to draw on him, you deposit in your bank a draft for the agreed amount. In effect, the other fellow allows you to write your check against his bank account. If you need money quickly, this is, and more particularly was then, a faster process than waiting for a remittance to be mailed.)

The other samples:

You have about 150 telephones. I have received but $73.

. . .

It costs something to manufacture telephones and magnetos, especially the latter, & as you have about 400 of the instruments all told, ought I not to receive a remittance from you? I should be very much pleased

to see your autograph at the foot of a good-sized check but should not return a small one.

By November, Sanders, too, could write in a much more confident tone:

You have instruments on which the rental due is between $1200 and $1500. The amount I have received bears a very small proportion of this. If rentals in advance means anything it is time some attention was paid to it. This thing is no longer an experiment, it is *business.*

Also, he exhorted and instructed agents in this vein: "I receive letters every day asking about telephones—I refer them to you and still they come saying they have heard from you but cannot secure attention." Or in this: "You have a large field and I should think it would be advisable for you to appoint sub-agents and not quarrel with everybody. The field is not half supplied." Or this: "I am glad to see that you have established a New Hampshire agency—I have referred 3 or 4 customers to him already—I hope he is energetic as he has quite a field. New Hampshire people you know are slow but sure & there will yet be a considerable income from that state."

Even in November, however, with more than 2,000 telephones rented and Sanders convinced, as he says, that this was business, he had moments when he found the state of affairs a bit overwhelming. Witness his letter to Hubbard:

I like your suggestion about the collections of agents on instruments sent & see no reason why it should not be enforced. Meanwhile we must have some money for our present needs. I hope you can meet me in New York next week as something must be done. . . .

I am at your service at any time with sufficient notice for a daylight passage as I take my wife & child & propose Western New York and Detroit before I return

The Telephone.

The proprietors of the Telephone, the invention of Alexander Graham Bell, for which patents have been issued by the United States and Great Britain, are now prepared to furnish Tels. leases for the transmission of articulate speech through instruments not more than twenty miles apart. Conversation can be easily carried on after slight practice and with the occasional repetition of a word or sentence. On first listening to the Telephone, though the sound is perfectly audible, the articulation seems to be indistinct; but after a few trials the ear becomes accustomed to the peculiar sound and finds little difficulty in understanding the words.

The Telephone should be set in a quiet place, where there is no noise which would interrupt ordinary conversation.

The advantages of the Telephone over the Telegraph for local business are

1st. That no skilled operator is required, but direct communication may be had by speech without the intervention of a third person.

2d. That the communication is much more rapid, the average number of words transmitted a minute by Morse Sounder being from fifteen to twenty, by Telephone from one to two hundred.

3d. That no expense is required either for its operation, maintenance, or repair. It needs no battery, and has no complicated machinery. It is unsurpassed for economy and simplicity.

The Terms for leasing two Telephones for social purposes connecting a dwelling-house with any other building will be $20 a year, for business purposes $40 a year, payable semiannually in advance, with the cost of expressage from Boston, New York, Cincinnati, Chicago, St. Louis, or San Francisco. The instruments will be kept in good working order by the lessors, free of expense, except from injuries resulting from great carelessness.

Several Telephones can be placed on the same line at an additional rental of $10 for each instrument; but the use of more than two on the same line where privacy is required is not advised. Any person within ordinary hearing distance can hear the voice calling through the Telephone. If a louder call is required one can be furnished for $5.

Telegraph lines will be constructed by the proprietors if desired. The price will vary from $100 to $150 a mile; any good mechanic can construct a line; No. 9 wire costs 8¢ cents a pound, 320 pounds to the mile; 34 insulators at 25 cents each; the price of poles and setting varies in every locality; stringing wire $5 per mile; sundries $10 per mile.

Parties leasing the Telephones incur no expense beyond the annual rental and the repair of the line wire. On the following pages are extracts from the Press and other sources relating to the Telephone.

GARDINER G. HUBBARD.

CAMBRIDGE, MASS., May, 1877.

For further information and orders address

THOS. A. WATSON, 109 COURT ST., BOSTON.

The first telephone advertisement offers "Telephones for the transmission of articulate speech through instruments not more than twenty miles apart." The offer was for private-line use, since telephone exchange service was not developed until 1878

here [Boston]. Will you endeavour to get to New York next week and relieve my mind on various vexatious points. . . .

I wish you lived nearer & had more leisure in which perhaps you join me. With regards to Mrs. Hubbard.

The Responsibility for Service

SINCE Gardiner Greene Hubbard was away from Boston most of the time, not many of his letters found their way into Devonshire's book. Those that did repeat quite often the statement: "We do not sell any telephones, only lease them at the annual rate of $40 a year for a set of four." For it was very clear to Hubbard that if telephone service should ever develop, it would be because the telephone company made itself responsible for the working of that service. He was often urged to sell telephones and let the buyers do what they pleased with them, but he understood, with remarkable foresight, that however attractive that way might seem momentarily, it was likely to be a blind alley in the long run.

We find Hubbard writing to George L. Bradley, of Providence, R. I., on October 12, 1877, the letter that led within a few months to formation of the first Bell telephone corporations (the New England Telephone Company and The Bell Telephone Company), to which Bradley and other investors subscribed fresh capital that relieved the terrific strain on Sanders' resources. Bradley was to become general agent of the new companies, later treasurer, and to continue as treasurer when they were combined to form the National Bell Telephone Company. But all that was in the future. Hubbard's October, 1877, letter told Bradley this:

The Bell Telephone Co. commenced leasing telephones in June last as an experiment without knowing either the best way of introducing them to the public or what was to be the value of the invention.

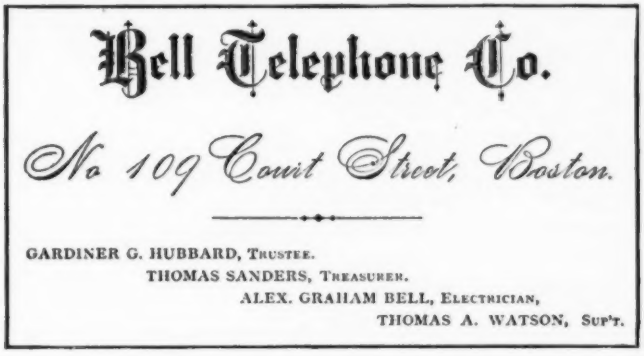
On the first of October we had rented 2,000 telephones. A continually increasing demand, and extension of the uses to which the telephone is applied satisfy us that it meets a great public need, and will be almost universally used.

From this point, Hubbard's letter goes on to state the prospects for revenue (still on a private-line basis; the possibility of exchanges not even mentioned) and to give a memorandum proposing formation of what turned out to be the New England Telephone Company.

Making Things Work

INTERESTING revelations of behind-the-scenes activity in the infancy of our business appear in the letters of Tom Watson, written as he filled his triple rôle of inventor, engineer, and plant chief.

We often find him sending specifications for new ringing devices to the company's patent attorney at Washington. For, as soon as Watson had succeeded in overcoming a booming effect that made the lecture-demonstration telephones unsuitable for everyday use, he had to find some kind of call signal. His first, never satisfactory, was a thumper that produced a snare-drum rattle at the called telephone. His next, also unsatisfactory, came to be known as Watson's buzzer, although the noise it made was actually a howl caused by sending alternately strong and weak current through an induction coil. Finally he began developing magneto or turn-the-crank bells, and while his



The business card of the Bell Telephone Company of 1877. The address, 109 Court Street, was that of Charles Williams' electrical shop, where were manufactured the box and hand telephones mentioned in so many of the early letters

first attempts were fumbling, he soon produced so good a bell that it continues in use today.

When not writing specifications for new "calls," or placatory letters explaining how to make his less reliable models work, Watson found time to cover many subjects. He sent out instructions like these:

> Talk to the box instrument with lips touching the mouthpiece, keeping the hand instrument close to the ear.
>
> . . .
>
> If a thunderstorm threatens, insert the small plug in the hole in the lightning arrester. The instruments are then cut out.

A great deal of Watson's time was devoted to experiments. For example, he wrote to J. C. Gaines, at Duxbury, Massachusetts, to ask if he might listen on the transatlantic telegraph cable (the French cable) that terminated there. In a second letter he said,

> I think you misunderstand me. I did not wish to try to talk through the cable as Mr. Bell is at present [1877] in Europe experimenting in that direction. What I wanted to do was to connect with your cable and listen to find out what noises there were; which would enable me to prepare Instruments to use with greater hopes of success in case Prof. Bell should make arangements to try to talk through a Trans-Atlantic cable.

Incidentally, these experiments by Watson and associates who were enlisted on this side of the ocean, plus tests arranged in England by B 1, ruled out any attempts at transatlantic conversations through the undersea cables.

Letters from Watson to Hilborne L. Roosevelt, in New York, indicate that he tried more than once during 1877 to talk from Boston to New York, over borrowed telegraph wires. In one letter, these lines occur: "The fact that we could not hear as well on 4 wires as we could on one would seem to indicate that it is not the resistance of the circuit that lessens the loudness of the sound, but the little innumerable escapes in the line. How does this strike you? There is

no doubt that with a special compound wire we could do despatch business between the two cities." It is interesting here to observe Watson's concern over the possibilities of long distance service even before exchange service existed.

In October, we find Watson getting quotations and placing his first order for 100 rubber hand telephones—ancestors of the millions of black rubber receivers that have since been used. He also experimented with celluloid cases.

There is a not wholly unfamiliar note in this letter which he wrote to Hubbard in November:

> Have received several Telegraphs (*sic*) lately in regard to orders and I now rise to explain.
>
> Nothing would give me greater pleasure than to fill orders as they are received but there are so many urgent ones that I have to divide my product amongst them. I am doing my best to get instruments out & hope to catch up to my orders in about two weeks, I am so far behind hand that I have found it impossible to stick to any system except division of each day's product among the most urgent of the agents.
>
> In regard to enclosures in your last letter, Illinois man's invention is worthless in my opinion.
>
> Preece's idea for overcoming induction, mentioned in Mrs. Bell's letter, is the same that I explained to you some time ago when Cheever tested his Brooklyn Bridge cable.

We cannot be certain what Illinois man or invention is referred to, but Preece, in the final paragraph, was Sir William Henry Preece, later a wireless pioneer and authority on induction and then electrician for the British Post Office. Cheever was Charles A. Cheever who, with Hilborne L. Roosevelt, had the first Bell agency in New York City, which by this time was styled "The Telephone Company of New York." The Brooklyn Bridge "cable" that Cheever tested may have been a borrowed telegraph cable, but more probably was a line supplied to J. Lloyd Haigh, who was manufacturing wire for the Bridge suspension cables, and who had probably the first telephone line across the East River strung on the bridge from his office in New York to his plant in South Brooklyn.

In a later letter to Hubbard, Watson says: "Have just received your telegraph saying to deliver no instruments except to those paying in advance. If I do that I won't have anybody to send to except Cornish, Haskins & Hamilton, so will pursue present plan until Mr. Sanders returns. Is this satisfactory?"

"Cornish" was T. E. Cornish, Bell agent at Philadelphia, later founder of the exchange there. The others mentioned were C. H. Haskins and H. H. Hamilton, agents at Milwaukee, Wis., and Sayre, Pa., respectively.

Watson's gentle sense of humor, which may be further sampled in his entertaining autobiography *Exploring Life*, occasionally crept into his letters in 1877. This is illustrated in one written to Frederick A. Gower. After Bell sailed to England, Gower had been given the exclusive right to lecture on the telephone in the United States, and he was not in the least inclined to share that privilege. That fact Watson dealt with in this way:

> The Rev. Elias Nason has just called upon me and wants to know if I will assist him to illustrate his telephone lecture with the Bell Telephone. I tell him I will do

so with pleasure if he will first *obtain your consent*. He left perfectly confident that he could obtain that and was a very happy man. Poor fellow!

TO QUOTE FURTHER from our first letterbook would be, in the main, repetitious. To spell out the contrasts between those earliest telephone days and now would be to labor the obvious. Let us take leave, then, of four men with whom we have formed a slight acquaintance. Their labors were fundamental: they sowed some of the seeds from which our great public service has sprung. Their ways parted after a relatively brief period, and only one of them—Devonshire—made the telephone his life's career. But as long as the tender tissue copies of their letters are preserved, they leave between the covers of that letterbook a bond among themselves, and with us.

EVERY
MAN, WOMAN and CHILD
SHOULD CAREFULLY EXAMINE THE WORKINGS OF
PROF. BELL'S
Speaking and Singing Telephone,
In its practical work of conveying
INSTANTANEOUS COMMUNICATION BY DIRECT SOUND,
Giving the tones of the voice so that the person speaking can be recognized by the sound at the other end of the line.
The Sunday School of the
Old John Street M. E. Church,
Having secured a large number of Prof. A. G. Bell's TELEPHONES, will give an EXHIBITION at the CHURCH, 44 & 46 JOHN ST. N. Y. where all visitors desiring can make for themselves a practical investigation of the Telephone, by asking questions, hearing the answers to their questions and listening to the singing conveyed through the Telephones from the other end of the line.
On Tuesday and Wednesday Afternoons
November 20th & 21st, 1877.
From 11½ A. M. until 7 P. M.
Admission to either Afternoon Exhibition 15 Cents.

A poster of the period

Fantastic or not, Gentlemen, we have just been chosen by the Book-of-the-Month Club

By permission of the *Saturday Review of Literature*

Desert Isle Books

SINCE THIS is vacation time, when one never knows how soon the canoe will capsize in the Hudson, it also is the open season for speculation as to life on that desert island. That is the island, it will be remembered, to which the reader may take three books of his choice. Two of these are, to be sure, only his choice by courtesy, for no potential castaway would dare start off without the Bible and Shakespeare. The third, however, may be his own. The good Republican might take the collected addresses of Thomas E. Dewey, perusing them in the twilight, and the exiled detective could do far worse than Father Brown.

The wise man, however, will take with him an even more familiar work than are these two. After the usual tradition, the Bible and Shakespeare will be for display purposes on the driftwood shelves, but the Manhattan telephone book will be for reading. That book at the side, and a wilderness immediately becomes true paradise.

There is, of course, no point in being on a desert island unless there is pleasure in it. A true castaway, clutching his Bible and Shakespeare and one other, is a castaway from choice. Intellectually, he may remember that the professors once told him of the poetry of Genesis, and he may have heard Maurice Evans give the death of kings speech of "Richard II." Naturally, he will plan to look up both those things during his chance vacation. That is a clear duty of the mind, and should be attended to without fail, somewhat later.

In the meanwhile, in the late afternoon when he has gathered his dinner of turtle eggs and coconuts, he is entitled to read a

bit for sheer pleasure. That pleasure best can be defined as seeing, in neat columns of four, some 1,500 pages of numbers he cannot call, of numbers that cannot call him back. What is "Hamlet" as opposed to this, and what the Song of Solomon?

The castaway will find the telephone book excellent reading at every hour of the day. It is, say, 9 o'clock on a Monday morning. What better form of relaxation can there be than to look up the number of the bank which once employed him, and then nod happily that he cannot call. He can visualize the bank's switchboard aglow with lights, as other vice presidents try to find him, and, looking up his own number, he can see that is the one which does not answer. He can spend a happy castaway morning not telephoning the dentist, the doctor, Joe and the locker room at the Yale Club. He can spend his lunch hour cheerfully tearing up memoranda which was not telephoned in during his absence. As the afternoon wears on, he can look up the number of the Stork Club, not telephoning for a reservation, and he can get into a violent argument with the box-office man at the Empire. All these things he can do with the daylight, but it is with the evening that the castaway, reading on, can truly reach the summit of his pleasure.

The evening with a telephone book on a deserted island could be wonderful. It is summer, and all around the home neighborhood chance parties are in progress. Hostesses on several pages are looking up the number, but his will not answer and so he will keep out of trouble. That one number he called perhaps too often, with the seriousness of Hamlet and the lamentation of Job, he cannot telephone tonight. Perhaps she is sitting there, and rightly so, for now it is her turn to wait.

With the evening, the castaway can become a man about town, a roué of the coconuts. He can look up and not call all the girls on a given page whose first name is Ann, and he can take the most likely on a series of wild, improbable adventures. He can stay out all night, and come back in the morning with his high silk hat battered flat. Later on he can look up her number again, but it is obvious that he cannot call to apologize. That charming incident has been ended cleanly.

As time drifts on, and the days pass along into weeks and months, the castaway will find that the circle of his friendships has widened and increased. Chance companions may be found on every page, and many of them, like the Smiths and Browns, have relatives. After a particularly large turtle has waddled up the beach, he can decide to give the perfect dinner party, the one with lists of guests but at which he eats all the meat himself.

The weeks will pass into months and years of a perfect life until a cloud, in the form of a ship, comes slowly forward from the horizon. The true castaway then will leave on the driftwood shelves for Friday the copies of Shakespeare and the Bible. To the lagoon inland, he then will flee, carrying that other—a free soul who can neither call nor answer, the man with the best third book for the desert isle.

From *The New York Times*, by permission.

Twenty-five Years Ago in the BELL TELEPHONE QUARTERLY

Items from Volume III, Number 3, July 1924

Transmission of Pictures Over Telephone Wires

WORLDWIDE INTEREST has been created by the demonstration on May 19 of the transmission of photographs over telephone wires between Cleveland and New York, a distance of 522 miles. The pictures were reproduced in the New York newspapers of May 20 and the achievement was hailed as "a great scientific triumph" and "another of the world's wonders. . . ."

For many years the Research Laboratories of the American Telephone and Telegraph Company and the Western Electric Company have been engaged in the solution of problems which directly or indirectly made picture transmission possible. When the solution of the picture problem was sought, there were available the whole vacuum tube art, electrical filters, accurate synchronizing methods, light valves and photo-electric cells, all important elements enabling the engineers to go ahead and develop from these a complete working system. . . .

The credit for the actual work of development of this new process of sending pictures over telephone wires belongs to many engineers. It is the result of the concerted efforts of specialists in the system of communications, demonstrating once again the advantages to be gained from a large research organization cooperating in the solution of technical problems. It is an example of the cumulative results of past discoveries and researches.

The importance of the new invention was at once recognized. Within 48 hours cable requests for information and details came from the leading countries of Europe and South America. In the United States the newspapers were enthusiastic in their praise. Practically all the larger papers of the country reproduced the pictures that were sent in the initial tests, with a detailed description of the apparatus and extended comment. From Maine to California the reaction proved most favorable, it being recognized that a truly great engineering achievement had been accomplished and that this new development in the field of communication meant opening the door to the general transmission of pictures by wire. . . .

The Bell Room at Salem

ON JUNE 5 there was a meeting of historical interest to all telephone people in the Salem, Massachusetts, Young Men's Christian Association building, which is located on the site of the old Sanders house. There Alexander Graham Bell tutored the deaf child of Thomas Sanders and did much of the experimental work that led up to the invention of the telephone. On this occasion a room was dedicated as a memorial of the association of the location with the telephone. A set of models of early telephone instruments, made under the supervision of Wilton L. Richards of the Bell System Historical Museum, was presented by E. W. Longley, Vice-President of the New England Telephone and Telegraph Company, Mr. H. B. Thayer, President of the American Telephone and Telegraph Company, and John J. Carty sent messages of congratulation expressing the interest felt throughout the Bell System in such a historic occasion.

Bell Laboratories and Western Electric To Operate Sandia Laboratory for AEC

Selection of the Bell Telephone Laboratories and the Western Electric Company to operate the Sandia Laboratory, at Sandia Base, Albuquerque, N. M., for the U. S. Atomic Energy Commission was announced on July 12 by the AEC in the following statement:

The United States Atomic Energy Commission announced today that the services of the Western Electric Company and the Bell Telephone Laboratories have been obtained for the operation of the Sandia Laboratory, at Sandia Base, Albuquerque, New Mexico.

Negotiations have been started on a contract for these services with the Western Electric Company, equipment manufacturing subsidiary of the American Telephone and Telegraph Company, in accordance with arrangements between the Commission and Leroy A. Wilson, President of A. T. & T.

The new operators of the Laboratory will have an important function in bridging the gap between laboratory development work and the manufacturing operations on atomic weapons. Sandia is also an important point of contact between AEC operations and the military activities relating to atomic energy. The Sandia Laboratory has been operated since 1945 by the University of California under its contract for the operation of the Los Alamos Scientific Laboratory. Sandia has grown from a small liaison group representing Los Alamos into a major facility. The University of California advised the Commission last winter that the University felt it should not continue to manage Sandia as a part of the scientific research program of the Los Alamos Laboratory.

The growth of the Sandia Laboratory has been a result of the Commission's effort to integrate research, development, and production activities in accordance with best academic and industrial practice and with the most competent available supervision in each technical area.

After extensive consideration of the many complex organizational and technical problems that are involved, the Commission decided to ask A. T. & T. to make available to this project the full technical and managerial resources of the Bell System's developmental and manufacturing subsidiaries.

A special team of Western Electric, Bell Laboratories, and AEC officials will go to Sandia immediately to prepare for the transfer of the project to the new contractor. Included in the group are Stanley Bracken, President, Fred R. Lack, Vice President, Radio Division, and George A. Landry, Operating Manager, Installation Department, Western Electric Company; Dr. Mervin J. Kelly, Executive Vice President, and Donald A. Quarles, Vice President in charge of Staff, Bell Laboratories; and Brigadier General James McCormack, Jr., Director, Division of Military Application, AEC.

Operations of both Los Alamos and Sandia are carried on under the AEC's Santa Fe Office, of which Carroll L. Tyler is Manager. Head of the Commission's Sandia Area Office under Mr. Tyler is George P. Kraker. Dr. Norris E. Bradbury is Director of the Los Alamos Scientific Laboratory and Paul J. Larsen is Director of the Sandia branch.

Who's Who & What's What

in This Issue

"SIXTY-FOUR-DOLLAR QUESTIONS" might be an alternative title for this issue's first article; but the quiz program which HARRY DISSTON describes is more important than that on any radio program. Mr. Disston started his telephone career in 1921 with the New York Telephone Company in Manhattan, and became a district traffic superintendent in Brooklyn before changing to the Commercial Department. There he became successively district manager and division commercial superintendent. In 1932 he transferred to the Commercial Division of the Department of Operation and Engineering of the A. T. & T. Co., and for nine years fulfilled various assignments in the Commercial Results Section. He left for active military duty in 1941, and spent three of the next five years in the Southwest Pacific, with the First Cavalry Division, in command of an island forward base, on the staff of Gen. MacArthur's Service Forces, as Executive Officer of Manila, and on the General Staff of one of the invasion commands. He rose from Major to Colonel, was awarded the Legion of Merit and the Bronze Star Medal with Oak Leaf Cluster, and is Colonel commanding the Seventh Regiment, New York National Guard. He returned to A. T. & T. in January 1946, and is now in charge of the group engaged in telephone development, revenues, and expense analysis. This, as might be supposed from the tenor of his article, is the group which assists the Associated Companies of the Bell System in the plans, procedures, and organization of their Commercial forecasting activities.

ONE THING often follows another, and the article on the use of communications by the Red Cross in time of disaster follows a visit of this MAGAZINE'S editor to the scene of the record blizzards on the Great Plains

Harry Disston

Wade Jones

last winter, to observe their effect on telephone service. In Omaha he observed also the efficiency with which the humanitarian activities of the Red Cross in that area were organized and administered, and the important part which the telephone played therein. There followed then a suggestion to the national headquarters of the Red Cross in Washington that such a story would be well worth telling—and WADE JONES has undertaken to tell it. A staff writer in the Public Relations Department of the American National Red Cross, he was for three years a reporter on the *Stars and Stripes*, serving in that capacity in Africa, Italy, France, and Germany. He has also been a reporter on newspapers in Washington, D. C., and Richmond, Va., and for a time was radio news writer for the Columbia Broadcasting System in New York.

THE HISTORICAL LIBRARY of the A. T. & T. Company, in the headquarters building at 195 Broadway, New York, is a mine of historic facts, always interesting and frequently significant, to be discovered by a patient seeker. Those last words describe RALPH MOONEY, who has been Historical Librarian since early in 1945. After some

Ralph E. Mooney

years of newspaper and trade-journal experience, and service in World War I as Captain of Infantry, he joined the Southwestern Bell Telephone Company in 1922. He became editor of the *Southwestern Telephone News* in 1924, moved over to the advertising staff in 1938, and in 1944 transferred to the Information Department of the A. T. & T. Co. He contributed "Outwitting a River on a Rampage" to this MAGAZINE for Spring 1945.

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